

Engineering Controls for Tuberculosis: Upper-Room Ultraviolet Germicidal Irradiation Guidelines

Summary of External Peer Reviewer comments

The Alert was reviewed by external reviewers from academia, government, industry, and professional organizations. The external reviewers were charged with addressing specific and general technical questions. During their reviews, the reviewers also provided considerable technical comments on the document. The NIOSH authors found these comments to be very useful and, in most instances, the suggestions were incorporated into the document.

Specific Questions provided in the Charge to Reviewers

Question # 1 - Is the guideline provided for average UVGI intensity (30-50 $\mu\text{W}/\text{cm}^2$) in the upper-room air appropriate? Would some other guideline be more useful?

The reviewers differed in their response to Question #1. One reviewer thought the terms would not be familiar to many engineers and maintenance staff. One reviewer suggested additional research but thought it was useful to have established an upper-air average UV irradiance. One reviewer believed the UVGI range provided was appropriate while another reviewer suggested that a single value is best.

Question # 2 - Is the guideline for installing louvered fixtures that provide 0.17 UV-C watts per each ft^2 in a room appropriate? Is the guideline of 0.085 UV-C watts per ft^2 for fixtures without louvers in rooms with 9 ft or higher ceilings appropriate?

The reviewers who responded to Question 2 generally thought a guideline providing the UV-C watts per square foot of a room necessary to achieve an adequate UVGI level in the upper-room was appropriate.

Question # 3 – Other than the information provided in the draft document, what other methods are available for obtaining “spot measurements” of the upper-air UVGI intensity when the UVGI system is composed of multiple fixtures?

One reviewer noted that if UV fixtures are “pre-engineered” the UVGI output can be predicted and safe UVGI levels provided. Another reviewer noted that chemical actinometry is a research tool and provided other methods of spot measurement.

Question # 4 - Is it appropriate to provide a guideline that states UV lamps should be replaced when the lamps start to emit approximately 70% of their original output?

In general, the reviewers indicated that lamps should be changed on a fixed schedule. Based on the expected lamp life, “re-lamping” on a yearly basis was suggested.

Question # 5 – Under “air mixing guidelines” will the use of mixing fans have any affect on other infection control issues?

Some reviewers suggested additional information be provided in the document on methods to judge what is good air mixing. Another reviewer noted that air mixing by the use of a fan is not always desirable (e.g., if adequate air mixing already exists).

General Questions

The reviewers provided many helpful suggestions to the General Questions. Several reviewers noted that they believe the CDC/NIOSH maximum recommended exposure level (8 hours to UVGI at a wavelength of 254 nm of 0.2 $\mu\text{W}/\text{cm}^2$) for people in the lower-room limits the UVGI level in the upper-room thereby decreasing the effectiveness of upper-room UVGI systems.